



Report No.: GZE160713-E

NVLAP LAB CODE 201011-0

LM-79-08 Test Report

For

P.Q.L., Inc.

(Brand Name: Superior Life®)

2285 Ward Avenue / Simi Valley, CA 93065

Retrofit Kits for Outdoor Pole/Arm-mounted Area and Roadway

Representative (Tested) Model: 83831
83833

Model Different: All construction and rating are the same, except CCT

Test & Report By:

Jack Luo

Engineer: Jack Luo

Date: Jul.12, 2016

Review By:

Tommy Liang

Manager: Tommy Liang

Laboratory: Standard-Tech Co. Ltd Testing Center

NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

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<http://www.standard-tech.com>



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Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

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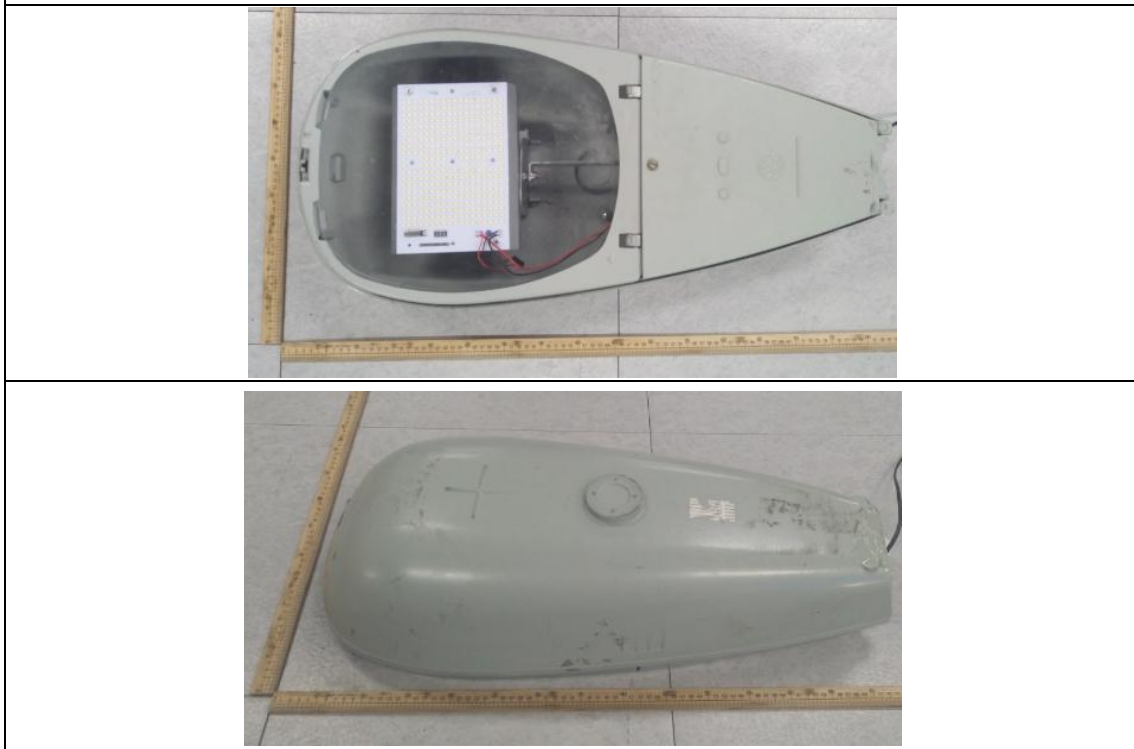
Fax: 8620-32290422

<http://www.standard-tech.com>

1.1 Product Information:

Organization Name	P.Q.L., Inc.	
Brand Name	Superior Life®	
Model Number	83831, 83833	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Retrofit Kits for Outdoor Pole/Arm-mounted Area and Roadway	
Rated Voltage / Frequency	347 -480Vac, 50/60 Hz	
Nominal Power	200W	
Rated Initial Lamp Lumen	--	
Declared CCT	4000K,5000K	
LED Manufacturer	Nichia Corporation	
LED Model	NF2L757DR	
Sample Number	GZE160713-E1(4000K), E2(5000K)	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Photo



1.2 Test Specifications:

Date of Receipt	Jul.10,2016
Date of Test	Jul.12,2016
Test item	<ol style="list-style-type: none"> 1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. Electrical Parameters
Reference Standard	<ol style="list-style-type: none"> 1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

1.3 Test Methods

1) Photometric and Light Distribution Measurement – Goniophotometer Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 347 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1 ° vertical intervals and 22.5 ° horizontal intervals.

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 347 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$. The sample was operated at 347 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

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2.1 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-07-12	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	83831		

Electrical Measurement in GE M250R2 Roadway Lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160713-	347.0	60	0.5740	197.7	0.9926	7.09
E1	480.0	60	0.4327	190.2	0.9158	14.41
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

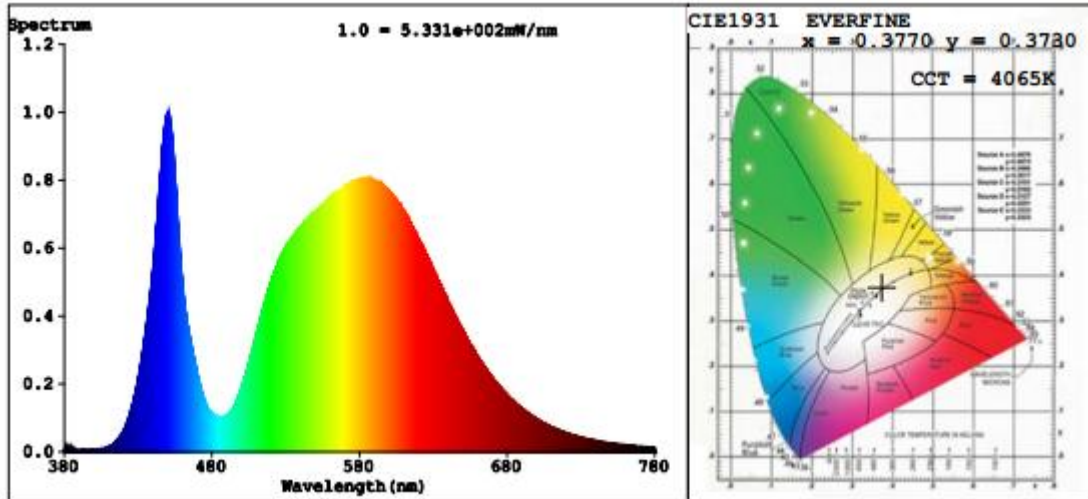
Chromaticity Measurement in GE M250R2 Roadway Lamp- Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	347.0	R1	71	R9	0
Frequency (Hz)	60	R2	79	R10	49
CCT (K)	4065	R3	84	R11	67
Duv	-0.0008	R4	72	R12	40
Chromaticity (x, y)	x=0.3770 y=0.3730	R5	70	R13	72
Chromaticity (u', v')	u'=0.2244 v'=0.4994	R6	69	R14	91
Color Rendering Index (CRI)	73.1	R7	82	R15	66
R9	0	R8	57	--	--

Photometric Measurement in GE M250R2 Roadway Lamp- Goniophotometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	347.0	480.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	28192	27339	>= 10000(-10%)	
Luminous Efficacy (lm/W)	142.60	143.74	Standard: >= 100(-3%)	Premium: >= 120(-3%)
Zonal lumens in the 0-90 °zone (%)	99.8	--	>= 100(-1)	
Zonal lumens in the 80-90 °zone (%)	0.4	--	<= 10(+3)	
Beam Angle (°)	114.7	--	--	
Center Beam Candle Power (cd)	10032	--	--	

Spectral Power Distribution & Chromaticity Diagram

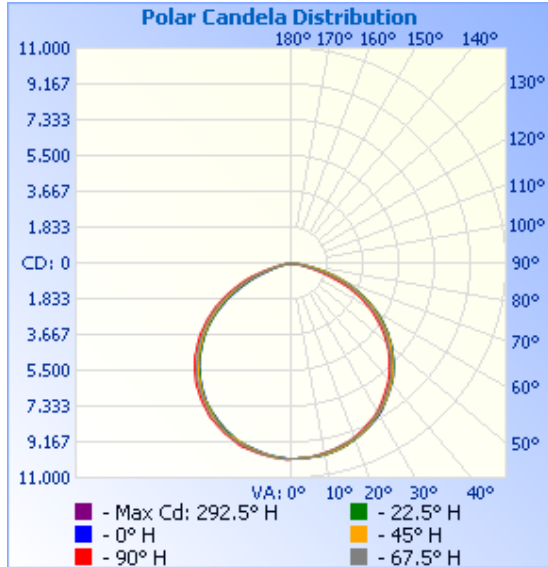


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	7,886.7	28%
0-40	13,031.7	46.2%
0-60	23,272.1	82.6%
60-90	4,856.5	17.2%
70-100	1,457.0	5.2%
90-120	17.8	0.1%
0-90	28,128.6	99.8%
90-180	60.2	0.2%
0-180	28,188.8	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	948.8	3.4%	90-100	3.2	0%
10-20	2,736.9	9.7%	100-110	6.2	0%
20-30	4,201.0	14.9%	110-120	8.4	0%
30-40	5,144.9	18.3%	120-130	10.2	0%
40-50	5,402.0	19.2%	130-140	10.1	0%
50-60	4,838.5	17.2%	140-150	8.7	0%
60-70	3,402.7	12.1%	150-160	7.1	0%
70-80	1,343.1	4.8%	160-170	4.6	0%
80-90	110.7	0.4%	170-180	1.8	0%

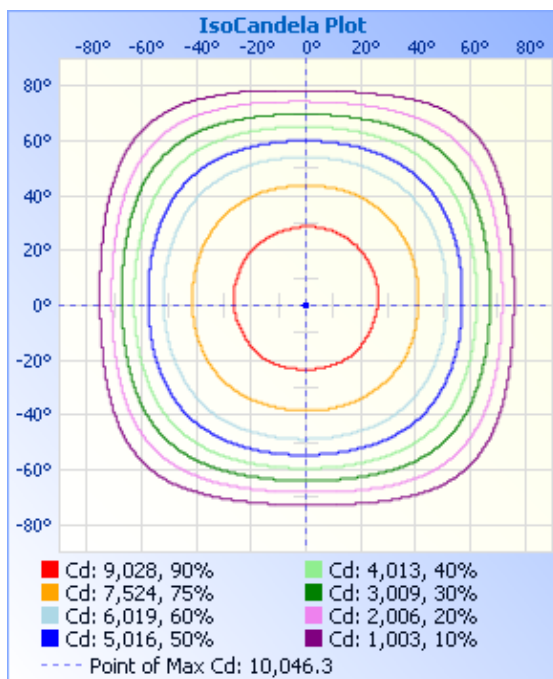
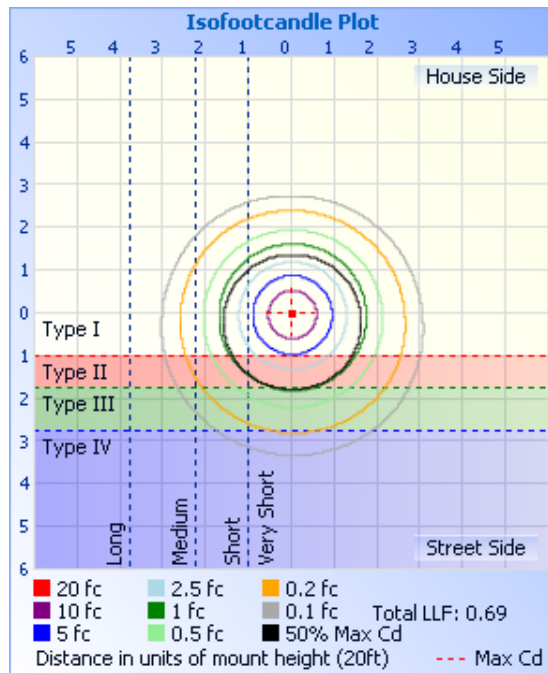
Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
17.0ft	34.7 fc	52.9 ft	53.1 ft
34.0ft	8.7 fc	105.9 ft	106.1 ft
51.0ft	3.9 fc	158.8 ft	159.2 ft
68.0ft	2.2 fc	211.8 ft	212.3 ft
85.0ft	1.4 fc	264.7 ft	265.4 ft
102.0ft	1.0 fc	317.7 ft	318.4 ft

■ Vert. Spread: 114.6°
■ Horiz. Spread: 114.7°



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Table--1

UNIT: ×10cd

C (DEG) Y (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	
0	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	
5	998	998	998	1000	1000	999	998	1001	1001	1000	997	993	994	994	996	998	
10	987	987	992	997	996	996	993	988	988	985	981	977	976	978	980	985	
15	972	972	978	985	982	982	980	971	971	966	959	957	958	955	957	963	
20	943	951	957	960	958	959	955	951	949	940	934	927	925	926	933	937	
25	908	918	926	932	932	930	930	921	915	905	900	892	886	888	895	899	
30	867	881	888	895	898	893	892	884	880	866	855	846	846	843	849	857	
35	817	834	840	847	850	850	848	839	829	818	802	792	789	792	796	807	
40	759	775	791	799	801	802	798	788	777	762	749	730	728	727	736	750	
45	695	712	727	739	740	743	734	722	713	693	678	663	656	655	667	678	
50	616	641	656	669	674	673	668	650	640	614	601	584	577	578	588	602	
55	532	559	575	588	597	595	589	576	557	533	513	494	485	486	499	515	
60	442	465	485	503	511	511	503	486	465	437	412	389	379	384	402	419	
65	338	366	388	403	415	414	407	385	363	328	297	274	263	276	296	314	
70	233	262	285	298	308	310	304	280	237	203	174	157	149	164	188	207	
75	111	150	178	192	196	203	193	150	112	84.1	66.3	58.4	56.0	64.1	75.1	87.8	
80	21.8	44.2	72.3	73.9	73.9	84.4	76.2	47.4	25.8	16.0	13.4	10.8	10.00	10.7	11.5	13.4	
85	5.65	6.72	8.26	7.69	7.43	9.81	9.54	6.05	4.88	3.71	2.74	2.81	3.02	3.01	3.52	4.57	
90	0.20	0.35	0.48	0.58	0.79	0.78	0.65	0.40	0.48	0.17	0.21	0.43	0.22	0.35	0.58	0.18	
95	0.20	0.17	0.17	0.19	0.19	0.20	0.19	0.19	0.18	0.23	0.28	0.56	0.36	0.50	0.29	0.25	
100	0.40	0.34	0.30	0.27	0.25	0.28	0.31	0.33	0.31	0.36	0.41	0.57	0.84	0.56	0.46	0.40	
105	0.63	0.56	0.49	0.45	0.43	0.43	0.51	0.52	0.47	0.52	0.57	0.61	0.67	0.66	0.64	0.56	
110	0.87	0.78	0.67	0.62	0.65	0.63	0.68	0.73	0.67	0.68	0.69	0.69	0.77	0.73	0.75	0.75	
115	1.06	0.97	0.85	0.72	0.82	0.76	0.88	0.97	0.80	0.85	0.82	0.74	0.86	0.82	0.87	0.88	
120	1.19	1.11	1.03	1.02	0.97	0.92	1.05	1.11	0.90	0.96	0.97	0.95	0.89	0.98	0.99	0.93	
125	1.34	1.29	1.08	1.34	1.42	1.33	1.16	1.29	0.96	1.04	0.99	1.01	1.11	1.06	1.04	1.01	
130	1.42	1.37	1.15	1.43	1.51	1.43	1.25	1.32	1.14	1.08	1.09	1.07	1.12	1.12	1.20	1.10	
135	1.45	1.34	1.22	1.51	1.52	1.52	1.33	1.32	1.26	1.13	1.11	1.34	1.12	1.37	1.22	1.22	
140	1.47	1.32	1.23	1.59	1.55	1.58	1.32	1.39	1.32	1.26	1.10	1.42	1.12	1.39	1.13	1.36	
145	1.46	1.23	1.29	1.62	1.43	1.62	1.14	1.35	1.43	1.32	1.17	1.46	1.13	1.40	1.30	1.45	
150	1.44	1.26	1.51	1.65	1.64	1.68	1.39	1.41	1.48	1.42	1.39	1.57	1.32	1.43	1.64	1.48	
155	1.40	1.34	1.65	1.77	1.74	1.70	1.55	1.52	1.46	1.48	1.49	1.61	1.30	1.35	1.71	1.53	
160	1.40	1.35	1.67	1.78	1.72	1.69	1.58	1.56	1.46	1.51	1.50	1.62	1.36	1.30	1.60	1.62	
165	1.51	1.39	1.71	1.70	1.68	1.74	1.59	1.59	1.60	1.47	1.52	1.63	1.46	1.34	1.54	1.74	
170	1.71	1.59	1.94	1.90	1.74	1.91	1.93	1.71	1.77	1.79	1.68	1.85	1.91	1.80	1.91	2.07	
175	1.84	1.80	2.03	1.92	1.89	1.95	2.03	1.81	1.91	1.92	1.80	1.91	1.95	1.87	1.95	2.06	
180	1.79	1.76	1.84	1.78	1.77	1.81	1.95	1.78	1.79	1.79	1.73	1.83	1.81	1.77	1.81	1.94	

2.2 Electrical, Photometric and Chromaticity Measurements

(Refer to Work Instruction QD25)

Test date	2016-07-12	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	83833		

Electrical Measurement in GE M250R2 Roadway Lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
GZE160713-	347.0	60	0.5776	198.7	0.9914	7.16
E1	480.0	60	0.4340	191.3	0.9183	14.22
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

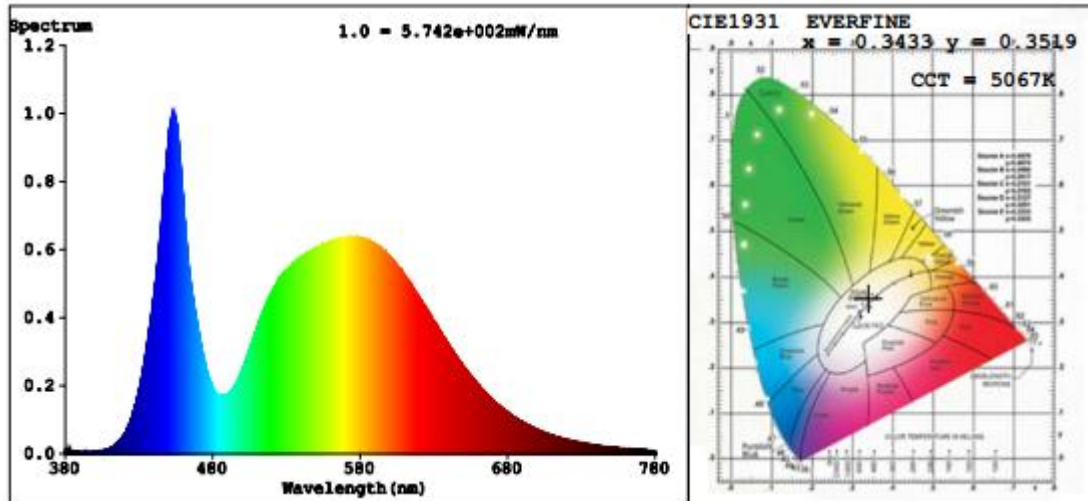
Chromaticity Measurement in GE M250R2 Roadway Lamp- Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	347.0	R1	75	R9	0
Frequency (Hz)	60	R2	83	R10	57
CCT (K)	5067	R3	87	R11	72
Duv	0.0009	R4	76	R12	50
Chromaticity (x, y)	x=0.3433 y=0.3519	R5	75	R13	76
Chromaticity (u', v')	u'=0.2101 v'=0.4846	R6	75	R14	92
Color Rendering Index (CRI)	76.9	R7	84	R15	70
R9	0	R8	61	--	--

Photometric Measurement in GE M250R2 Roadway Lamp- Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.0 Pass Criteria	
Test Voltage (V)	347.0	480.0	--	
Frequency (Hz)	60	60		
Total Luminous (lm)	28913	27884	>= 10000 (-10%)	
Luminous Efficacy (lm/W)	145.51	145.76	Standard: >= 100(-3%)	Premium: >= 120(-3%)

Spectral Power Distribution & Chromaticity Diagram



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3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-331	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-01	2017-06-30
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
EE-09	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-01	2017-06-30
PF210	Power Meter for Goniophotometer	2016-07-01	2017-06-30
ST-R-181A	Temperature Tester	2016-07-01	2017-06-30
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

******* END OF REPORT *******